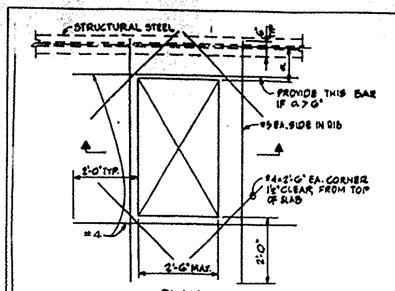
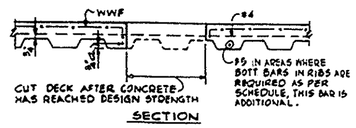



PLAN



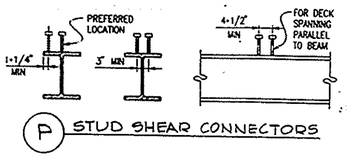

SECTION

UNFRAMED OPENING OR SLEEVE THROUGH SLAB ON STEEL DECK

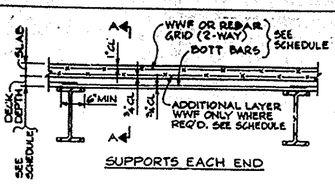
FOR DETAILS OF ADDITIONAL BARS AT REBAR GRIDS SEE Ⓜ. SIZE AND LOCATION OF OPENINGS NOT SHOWN IN STRUCTURAL DRAWINGS SHALL BE SUBMITTED THROUGH THE ARCHITECT TO THE STRUCTURAL ENGINEER FOR REVIEW.

Ⓝ SLAB/DECK

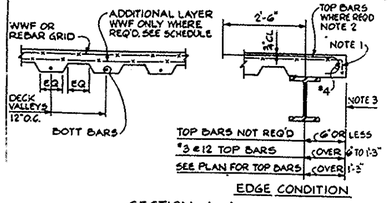
1. WHERE DECK SPANS PERPENDICULAR TO BEAMS, THE SHEAR CONNECTORS SHALL BE PLACED IN VALLEYS WITH A MAXIMUM OF 2 SHEAR CONNECTORS PER VALLEY, UNLESS OTHERWISE NOTED. SHEAR CONNECTORS SHALL BE KEPT CLEAR OF DECK ENDS, SEAMS, AND EMBOSSMENTS. SHEAR CONNECTORS SHALL NOT BE PLACED UNDER OR WITHIN 3" OF TRENCH HEADERS OR ELEVATORS SHEAVE BEAMS.
2. WHERE A SINGLE NUMBER IS INDICATED [ ] IN PLAN, THE NUMBER OF SHEAR CONNECTORS SHALL BE DISTRIBUTED UNIFORMLY ALONG THE LENGTH OF THE BEAM, UNLESS OTHERWISE NOTED.
3. WHERE A SINGLE NUMBER IS INDICATED [ ] IN PLAN AND THE EXTENT IS DESIGNATED BY ARROWS, THE NUMBER OF SHEAR CONNECTORS SHALL BE DISTRIBUTED UNIFORMLY ALONG THE DESIGNATED LENGTH.
4. WHERE [MIN] IS INDICATED IN PLAN, PROVIDE SHEAR CONNECTORS AT 24" O.C.
5. UNIFORM SPACING ON BEAMS WITH DECK SPANNING PERPENDICULAR SHALL BE ACHIEVED AS FOLLOWS:
   - WHERE THE NUMBER OF SHEAR CONNECTORS IS LESS THAN THE NUMBER OF VALLEYS, INTERMIX 12" AND 24" SPACING.
   - WHERE THE NUMBER OF SHEAR CONNECTORS IS GREATER THAN THE NUMBER OF VALLEYS, INTERMIX ONE SHEAR CONNECTOR PER VALLEY WITH TWO SHEAR CONNECTORS PER VALLEY APPLICATION, WITH A MAXIMUM SPACING OF 12" O.C.




Ⓟ STUD SHEAR CONNECTORS

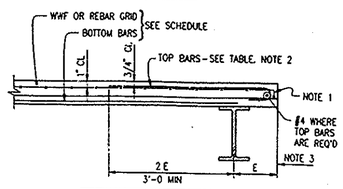



SUPPORTS EACH END




EDGE CONDITION

SECTION A-A

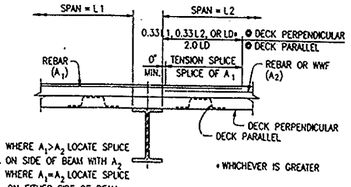



| ℓ | TOP BARS |
|---|---|
| TO 7' | NOT REQUIRED |
| OVER 7' TO 2'-0 | #3 @ 12 |
| OVER 2'-0 TO 3'-6 | #4 @ 12 |
| OVER 3'-6 TO 4'-0 | #4 @ 6 |

CANTILEVER

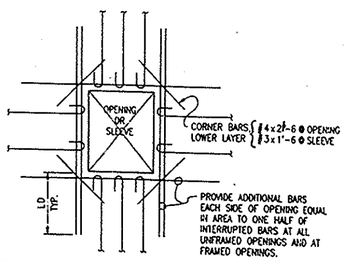
NOTES:
1. BEND OVER WWF. FOR REBAR GRID PROVIDE STANDARD HOOK.
2. WHERE GRID REBARS ARE EQUAL TO OR GREATER IN AREA PER FOOT THAN REQUIRED TOP BARS, TOP BARS MAY BE OMITTED.
3. FOR LOCATION SEE PLAN. IF NOT NOTED IN PLAN OR SECTION, EDGE OF SLAB IS FLUSH WITH EDGE OF FLANGE.

Ⓚ SLAB/DECK




SPLICING REINFORCEMENT IN REBAR GRID

Ⓛ SLAB/DECK

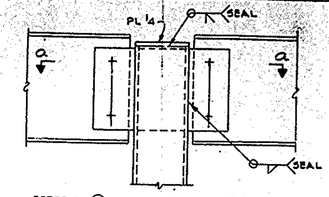



FRAMED AND UNFRAMED OPENING OR SLEEVE THROUGH SLAB ON STEEL DECK WITH REBAR GRID

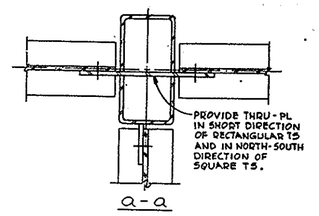
FOR BOTTOM BAR ARRANGEMENT SEE Ⓝ.

SIZE AND LOCATION OF OPENINGS NOT SHOWN IN STRUCTURAL DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW.

Ⓜ SLAB/DECK




REFER TO Ⓑ FOR INFORMATION NOT SHOWN




a-a

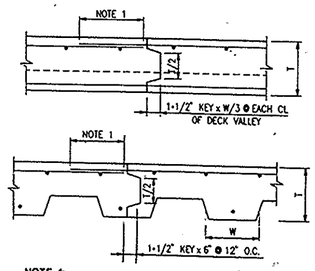
Ⓕ CONNECTION OF BEAM TO TS COLUMN

1. For extent of slab/deck type, see plans and details. For description of slab/deck type, see schedule and details.
2. For spans with supports at both ends, provide deck proportioned compositely to sustain the superimposed load indicated in schedule, except that, for spans including trench headers, provide deck proportioned non-compositely.
   Provide deck proportioned also to satisfy the following criteria for function as a form:
   A. Dead load deflection limited to 1/180 of span or .75 in., whichever is smaller.
   B. Steel stress limited to not more than 26700 psi for dead load plus 200 lb. concentrated load at midspan or, steel stress limited to not more than 20000 psi for dead load plus 20 psf additional load, whichever is more severe.
3. For deck supporting cantilevers, provide deck proportioned to satisfy the following criteria for function as a form:
   A. Dead load deflection limited to 1/90 of overhang or .375 in., whichever is smaller.
   B. Steel stress limited to not more than 26700 psi for dead load plus 200 lb. concentrated load at outside end of overhang or, steel stress limited to not more than 20000 psi for dead load plus 20 psf additional load, whichever is more severe.
4. NW indicates normal weight aggregate concrete. LW indicates lightweight aggregate concrete.
5. Provide additional concrete as required to compensate for deflections of beams and of steel deck.

Ⓖ SLAB/STEEL DECK

| TYPE | DECK DEPTH (IN.) | SLAB DEPTH (IN.) | SLAB AGGREGATE | SUPERIMPOSED LOAD (PSF) | REINFORCING: WWF OR REBAR GRID | REINFORCING: BOTTOM BARS | REMARKS |
|---|---|---|---|---|---|---|---|
| D1 | 2 | 4 | LW | 200 | 6x6 W2.0xW2.0 (N-S) #4@9 (E-W) | | BULKHEAD |
| D2 | 2 | 4½ | LW | 700 | 6x6 W2.0xW2.0 | | FUEL OIL TANK ROOM ROOF |
| D3 | 1½ | 4 | LW | 200 | 6x6 W2.0xW2.0 | | MISC |

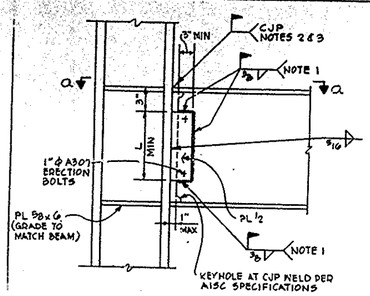
Ⓗ SLAB/DECK



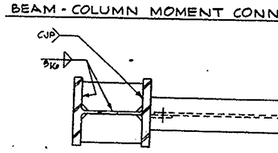

NOTE 1:
TENSION SPLICE IN REBAR GRID ONLY WHERE ACCEPTED BY STRUCTURAL ENGINEER. STAGGER SPLICE.

CONSTRUCTION JOINT

Ⓙ SLAB/DECK



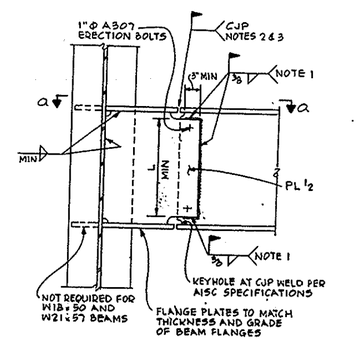

BEAM - COLUMN MOMENT CONNECTION




| BEAM SIZE | L |
|---|---|
| W27x84 | 18. |
| W27x84 FY50 | 21 |
| W18x50 | 12 |
| W18x60 FY50 | 12 |
| W21x57 | 14 |

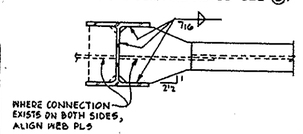
NOTES:
1. REFER TO TABLE FOR WELD LENGTH.
2. WELD FROM BOTH SIDES, WHERE BACKING BAR IS USED REMOVE BAR, BACK GOUGE, WELD FLUSH AND ADD A ⅝" REINFORCING FILLET WELD.
3. USE RUN-ON AND RUN-OFF TABS. REMOVE TABS AFTER WELDING AND FINISH TO SMOOTH CONTOURS PER 3.12.3 OF AWS D1.1-94.

Ⓓ CONNECTIONS




BEAM-COLUMN MOMENT CONNECTION

FOR TABLE AND NOTES SEE Ⓓ.




a-a

Ⓔ CONNECTIONS

| MINIMUM WELD SCHEDULE | |
|---|---|
| MATERIAL THICKNESS OF THICKER PART JOINED | MINIMUM WELD |
| 3/4" AND LESS | 1/4" |
| OVER 3/4" TO 1-1/2" | 5/16" |
| OVER 1-1/2" TO 2-1/4" | 3/8" |
| OVER 2-1/4" TO 6" | 1/2" |
| OVER 6" | 5/8" |

NOTES:

UNLESS OTHERWISE NOTED IN THE STRUCTURAL DRAWINGS, WELDS SHALL BE OF THE SIZE NOT LESS THAN GIVEN IN THE SCHEDULE.

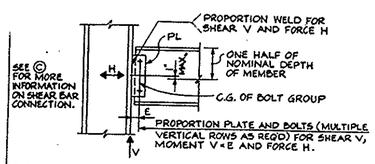
NOTATION IN THE DRAWINGS SHOWS "MIN" ASSOCIATION WITH THE APPROPRIATE FILLET OR PARTIAL PENETRATION WELD SYMBOL. FOR EXAMPLE:

MIN MIN

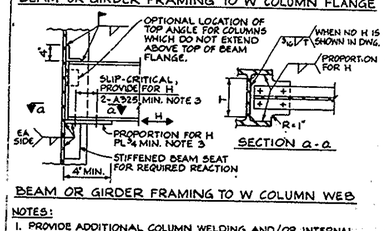
THE MINIMUM WELD SIZE APPLIES TO THE LEG DIMENSION OF FILLET WELDS AND TO THE MINIMUM EFFECTIVE THROAT OF PARTIAL PENETRATION GROOVE WELDS.

THE MINIMUM WELD SIZE NEED NOT EXCEED THE THICKNESS OF THE THINNER PART JOINED UNLESS A LARGER SIZE IS REQUIRED BY CALCULATED STRESS.

Ⓐ WELDS



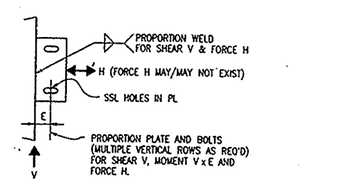

BEAM OR GIRDER FRAMING TO W COLUMN FLANGE




BEAM OR GIRDER FRAMING TO W COLUMN WEB

NOTES:
1. PROVIDE ADDITIONAL COLUMN WELDING AND/OR INTERNAL DIAPHRAGMS OR PLATES AS REQUIRED BY CONNECTION FORCES.
2. TOP FLANGE PLATES MAY BE USED AT THE CONTRACTOR'S OPTION. IF TOP PLATES ARE USED, PROVIDE STEEL DECK SUPPORT PL ⅜ x 3.
3. MINIMUM REQUIREMENTS SHOWN ARE TO BE PROVIDED EVEN WHEN NO H IS INDICATED IN DRAWINGS.
4. WHERE NOTED THUS $\frac{V,M,E}{H}$ IN DRAWINGS, H IS TO BE TAKEN THROUGH THE TOP AND BOTTOM FLANGES OF THE BEAM.

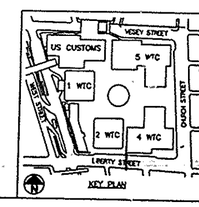
Ⓑ CONNECTIONS




BEAM END SHEAR BAR CONNECTION DETAIL

CONTRACTOR'S OPTION TO PROVIDE STANDARD ROUND HOLES IN CONNECTION PL OR SHORT-SLOTTED HOLES AS SHOWN ABOVE.

Ⓒ CONNECTIONS




Sheet 29 of 112

THE PORT AUTHORITY OF NY & NJ

ORIGINAL SIGNED & SEALED BY N.Y. P.E. (OR P.A.)

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Tel: (212) 563-7400, Fax: (212) 563-7382

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32 EAST 57TH STREET
NEW YORK, NY 10022-2550
TEL 212.750.9300 FAX 212.750.9330

I HEREBY CERTIFY THAT THIS IS A TRUE AND CORRECT COPY OF ONE OF THE CONTRACT DRAWINGS CONSTITUTING A PART OF CONTRACT NO. WTC-945.071 IN THE FORM IN WHICH SAID DRAWINGS EXISTED AT THE TIME THE SAID CONTRACT WAS EXECUTED BY THE PARTIES.

DATE 11/16/98 — SPEC. WRITER

DATE 11/20/98 — ENGINEER OF RECORD

| No. | Date | Revision | Approved |
|---|---|---|---|
| 1 | 12/2/97 | ADDED SLAB TYPE D5 | RZ |
| 0 | 11/17/97 | ISSUED FOR BID | - |

Engineering Department
Design Division

The World Trade Center

STANDBY POWER
5 WORLD TRADE CENTER

STRUCTURAL

TYPICAL DETAILS

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without it's written consent.

| Designed by | Drawn by | Checked By |
|---|---|---|
| MVS | JAL | RZ |

Date 11/17/97 Scale

Contract Number WTC-945.071 Drawing Number S1-01

5960500